What is claimed is:

1. A genetic construct comprising:

a polynucleotide sequence encoding at least a portion of a eucaryotic virus capsid polypeptide wherein said polypeptide is able to participate in formation of a LSVL in vitro.

2. The construct of claim 1, wherein said capsid polypeptide is a flavivirus capsid polypeptide.

3. The construct of claim 1, wherein said viral capsid polypeptide is a human hepatitis C capsid polypeptide.

4. The construct of claim 3, wherein said human hepatitis C capsid polypeptide comprises SEQ ID NO: 1.

5. A eukaryotic virus pseudo-nucleocapsid comprising:

at least a portion of a viral capsid polypeptide; and

a polynucleotide, wherein said viral capsid polypeptide and polynucleotide together participate in

50

formation of a generally spheroid pseudo-nucleocapsid in vitro.

6. The virus pseudo-nucleocapsid of claim 5, wherein said viral capsid polypeptide is a flavivirus capsid polypeptide.

7. The virus pseudo-nucleocapsid of claim 5, wherein said viral capsid polypeptide is hepatitis C virus capsid polypeptide.

8. A system for isolating antagonists or agonists of viral capsid assembly comprising the steps of:

expressing a polynucleotide sequence encoding a recombinant viral capsid assembly polypeptide sequence in a archeal, prokaryotic or eukaryotic host;

purifying the viral capsid assembly polypeptide sequence;

determining conditions enabling viral capsid or pseudo- nucleocapsid assembly in vitro; and

admixing potential antagonists or agonists to the determined conditions and measuring enhancement or derogation of viral capsid or pseudo-nucleocapsid assembly.

9. The system of claim 8, wherein the determining conditions enabling viral capsid or pseudo-nucleocapsid capsid assembly in vitro comprise determining the composition and quantity of a polynucleotide able to promote pseudo-nucleocapsid capsid assembly.

10. The system of claim 8, wherein the determining conditions enabling viral capsid or pseudo-nucleocapsid capsid assembly in vitro comprise determining the composition and quantity of a tranfer RNA able to promote pseudo-nucleocapsid capsid assembly.

11. The system of claim 8, wherein the recombinant viral capsid assembly polypeptide sequence is functionally homologous to a HCV core protein sequence.

12. The system of claim 11, wherein the HCV core protein sequence comprises SEQ ID NO.: 1.

13. The system of claim 11, wherein the HCV core protein sequence is represented by truncations of SEQ ID NO.:1.

14. A system for isolating aptamers that function to catalyze viral capsid assembly comprising the steps of:

(a) synthesizing a random phosphodiester oligonucleotide library;

(b) mixing the oligonucleotide library with a solution comprising one or more types of purified recombinant viral capsomer polypeptides;

(c) separating pseudo-nucleocapsids formed;

(d) amplifying oligonucleotides associated with the separated pseudo-nucleocapsids to create a selected oligonucleotide sub-library; and

(e) repeating steps (b) - (d) iteratively until an aptamer population of defined sequence is obtained.

15. The system of claim 14, wherein the purified recombinant viral capsomer polypeptides are derived from HCV.

16. The system of claim 14, wherein the purified recombinant viral capsomer polypeptides are derived from HCV and functionally homologous with the polypeptides comprising SEQ ID NO.:1.

17. A system for isolating aptamers that can function to agonize or antagonize viral capsid assembly comprising the steps of:

(a) synthesizing a random phosphodiester oligonucleotide library;

(b) admixing the oligonucleotide library with a solution of recombinant viral capsid polypeptides;

(c) isolating oligonucleotides bound to the viral capsid polypeptides;

(d) amplifying oligonucleotides associated with the separated viral capsid polypeptides to create a selected oligonucleotide sub-library;

(e) repeating steps (b) - (d) iteratively until an aptamer population of defined sequence is obtained;

(f) admixing aptamers of defined sequence obtained a viral pseudo-capsid or nucelocapsid or the constituents thereof; and

(g) determining the aptamers that are able to agonize or antagonize viral pseudo-capsid or nucelocapsid formation.

18. The system of claim 17, wherein the recombinant viral capsid polypeptides are derived from HCV.

19. The system of claim 18, wherein the recombinant viral capsid polypeptides are derived from HCV and functionally homologous with a polypeptide comprising SEQ ID NO.:1.

20. A genetic construct comprising:

a hepatitis C virus gene wherein said construct directs recombinant expression in a transformed eukaryotic host cell of at least one hepatitis C virus epitope by self-assembly of hepatitis C virus capsids comprising a capsid polypeptide, wherein said capsid polypeptide is characterized as having the amino acid sequence encoded by the amino acid sequence of SEQ ID NO.:1.

21. The construct of claim 20, wherein said capsid polypeptide is characterized as being encoded by the nucleotide sequence that encodes SEQ ID NO.: 1.

22. The construct of claim 20, wherein said hepatitis C virus capsids further comprise an RNA, and wherein recombinant expression of said RNA is directed either by said construct further comprising a hepatitis C virus genome or a different genetic construct comprising a hepatitis C virus genome.

23. The construct of claim 23, further comprising said hepatitis C virus genome.

24. The construct of claim 20, further comprising an insect cell vector, and wherein said host cell is an insect cell host.

25. The construct of claim 24, wherein said insect cell vector is a baculovirus vector and said insect cell host comprises a Sf-9 insect cell.

26. The construct of claim 20, further comprising a mammalian cell vector, and wherein said host cell comprises a mammalian cell host.

27. The construct of claim 26, wherein said mammalian cell vector comprises a vaccinia vector.

28. The construct of claim 20, further comprising a yeast cell vector, and wherein said host cell comprises a yeast cell host.

29. The construct of claim 25, wherein said baculovirus vector is formed by cotransfecting an Sf-9 insect cell with recombinant baculovirus DNA and wild-type baculovirus DNA.

30. A host cell transformed by the construct of claim 20.

31. A method for transforming a host cell comprising the step of introducing into said host cell the genetic construct of claim 20.

32. A method for producing at least one hepatitis C virus epitope, comprising the step of:

permitting a genetic construct, comprising a hepatitis C virus gene, to direct recombinant expression in a transformed eukaryotic host cell of at least one hepatitis C virus epitope by self-assembly of hepatitis C virus capsids comprising a capsid polypeptide, wherein said capsid polypeptide is characterized as having the amino

acid sequence encoded by the nucleotide sequence that encodes the polypeptide sequence of SEQ ID NO:1.

33. The method of claim 32, wherein said capsid polypeptide is characterized as being encoded by a nucleotide sequence that encodes a portion of SEQ ID NO: 1.

34. The method of claim 32, wherein said hepatitis C virus capsids further comprise a tRNA, and wherein recombinant expression of said genome is directed either by said construct further comprising a hepatitis C virus genome or a different genetic construct comprising a hepatitis C virus genome.

35. The method of claim 33, wherein said construct further comprises said hepatitis C virus genome.

36. The method of claim 32, wherein said construct further comprises a mammalian cell vector, and wherein said host cell is a mammalian cell host.

37. The method of claim 32, wherein said mammalian cell vector is a vaccinia vector.

38. The method of claim 32, wherein said construct further comprises a yeast cell vector, and wherein said host cell is a yeast cell host.

39. A self-assembled hepatitis C virus capsid comprising at least one hepatitis C virus T cell epitope produced by the method comprising the step of:

permitting a genetic construct, comprising a hepatitis C virus gene, to direct recombinant expression in a transformed eukaryotic host cell of said hepatitis C virus conformational epitope by self-assembly of hepatitis C virus capsids comprising capsid polypeptide, wherein said capsid polypeptide is characterized as having the amino acid sequence comprising SEQ ID NO: 1.

40. The capsid of claim 39, wherein said hepatitis C virus capsids further comprise a tRNA, and wherein

recombinant expression of said genome is directed either by said construct further comprising a hepatitis C virus genome or a different genetic construct comprising a hepatitis C virus genome.

5

Date Printed: 2006-12-20

41. A method of immunization of a host mammal in which a cellular immune response is produced to a hepatitis C virus, comprising the step of:

administering to said host, according to an immunizing dosage schedule, a self-assembled hepatitis C virus capsid comprising at least one hepatitis C virus conformational epitope produced by the method comprising the step of permitting a genetic construct, comprising a hepatitis C virus gene, to direct recombinant expression in a transformed eukaryotic host cell of said hepatitis C virus conformational epitope by self-assembly of hepatitis C virus capsids comprising a capsid polypeptide, wherein said capsid polypeptide is characterized as having the amino acid sequence of SEQ ID NO: 1.

42. The method of immunization of claim 41, wherein said hepatitis C virus capsids further comprise a tRNA, and wherein recombinant expression of said tRNA is directed either by said construct further comprising a hepatitis C virus genome or a different genetic construct comprising a hepatitis C virus genome.

43. The method of immunization of claim 42, wherein said construct further comprises said hepatitis C virus genome.

44. A diagnostic kit for detecting antibodies to hepatitis C virus in a specimen from a mammal comprising:

(1) a self-assembled hepatitis C large spherical virus-like particle comprising a capsid polypeptide having the same sequence as the amino acid sequence encoded by SEQ ID NO: 1, wherein the self-assembled hepatitis C virus-like particle comprises at least one hepatitis C virus conformational epitope, and said self-assembled hepatitis C large spherical virus-like particle is produced by a method comprising the step of permitting a genetic construct, comprising a hepatitis C virus gene, to direct recombinant expression in a transformed eukaryotic host cell; and

(2) materials for detecting binding between said self-assembled hepatitis C large spherical virus-like particle and antibodies to hepatitis C virus in said

specimen, effective to determine the presence or amount of said antibodies to hepatitis C virus, in a unit package container.

45. A diagnostic kit for detecting hepatitis C virus in a specimen from a mammal comprising:

(1) a self-assembled hepatitis C large spherical virus-like particle comprising a capsid polypeptide, wherein the self-assembled hepatitis C large spherical virus-like particle does not contain an RNA, said capsid polypeptide having the same sequence as the amino acid sequence encoded by SEQ ID NO: 1, wherein the self-assembled hepatitis C virus-like particle comprises at least one hepatitis C virus conformational epitope, and said self-assembled hepatitis C large spherical virus-like particle is produced by a method comprising the step of permitting a genetic construct, comprising a hepatitis C virus genes to direct recombinant expression in a transformed eukaryotic host cell; and

(2) materials for detecting binding between said self-assembled hepatitis C virus-like particle and antibodies to hepatitis C virus in said specimen, effective to determine the presence or amount of said antibodies to hepatitis C virus, in a unit package container.

46. A self-assembled hepatitis C virus capsid comprising at least one hepatitis C virus conformational epitope produced by the method comprising the step of:

permitting a genetic construct, comprising a hepatitis C virus gene, to direct recombinant expression in a transformed eukaryotic host cell of said hepatitis C virus conformational epitope by self-assembly of hepatitis C virus capsids comprising capsid polypeptide, wherein said capsid polypeptide is characterized as having the amino acid sequence encoded by the nucleotide sequence of SEQ ID NO: 1.

47. The capsid of claim 46, wherein said hepatitis C virus capsids further comprise an RNA, and wherein recombinant expression of said genome is directed either by said construct further comprising a hepatitis C virus genome or a different genetic construct comprising a hepatitis C virus genome.

48. The capsid of claim 47, wherein said construct further comprises said hepatitis C virus genome.

add B1

add C7